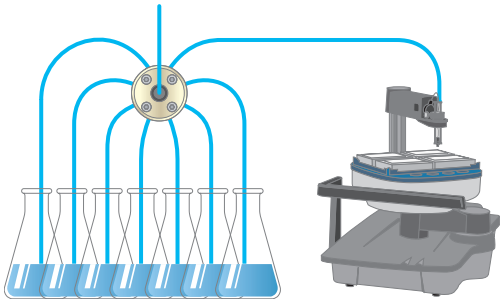
GE Healthcare

ÄKTAdesign

Fractionation Kit

User Manual



ÄKTA™

Important user information

All users must read this entire manual to fully understand the safe use of Fractionation Kit.

WARNING!

The WARNING! sign highlights instructions that must be followed to avoid personal injury. It is important not to proceed until all stated conditions are met and clearly understood.

CAUTION!

The Caution! sign highlights instructions that must be followed to avoid damage to the product or other equipment. It is important not to proceed until all stated conditions are met and clearly understood.

Note

The Note sign is used to indicate information important for trouble-free and optimal use of the product.

CE Certifying

This product meets the requirements of applicable CE-directives. A copy of the corresponding Declaration of Conformity is available on request.

The **CE** symbol and corresponding declaration of conformity, is valid for the instrument when it is:

– used as a stand-alone unit, or

– connected to other CE-marked GE Healthcare instruments, or

– connected to other products recommended or described in this manual, and

– used in the same state as it was delivered from GE Healthcare except for alterations described in this manual.

Recycling

This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of equipment.

WARNING!

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to make adequate measures.

Contents

1 Introduction
1.1 General 7
1.2 Large volume fractionation 7
1.3 Configuration overview 8

2 Safety

3 Prerequisites

4 Installation
4.1 General mounting instructions 13
4.1.1 UniNet connection 14
4.1.2 Valve ID 14
4.2 Unpacking 15
4.3 Installing the outlet valve 15
4.3.1 Mounting the valve 15
4.3.2 Installing the UniNet-2 cables 15
4.3.3 Connecting the tubing 16

5 Preparation for use
5.1 Software configuration 17
5.1.1 Starting the system 17
5.1.2 Installing the strategy and component in UNICORN 17
5.2 Testing the outlet valve 19

6 Operation
6.1 UNICORN 3.20 – 3.22 21
6.1.1 Using the outlet valve for flowthrough fractionation 21
6.1.2 Using the outlet valve for large volume fractionation 23
6.2 UNICORN 4.0 – 5.01 or higher 25

7 Short instructions
7.1 Converting to optional configurations 27
7.2 Reverting to standard configuration 28

Contents

1 Introduction

1.1 General

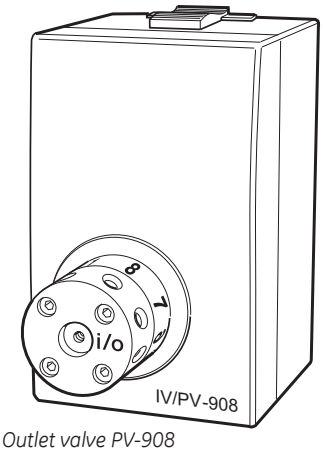
ÄKTAdesign standard system configurations can be changed to optional configurations. This flexibility in ÄKTAdesign system strategies allows the user to enhance already used purification methods and also to develop new, more complex methods.

When optional equipment is connected to a standard chromatographic system, new sets of instructions to control the optional equipment become accessible for the user.

Optional configurations are selected, installed and put into operation by the user. An optional configuration consists of both hardware components and software instructions.

Optional configurations are monitored and controlled via methods run by the UNICORN™ control system in the same way as ÄKTAdesign standard system configurations.

1.2 Large volume fractionation



Outlet valve PV-908

Collection of large fractions can be done automatically by using an additional 8-port outlet valve.

This functionality enables the following:

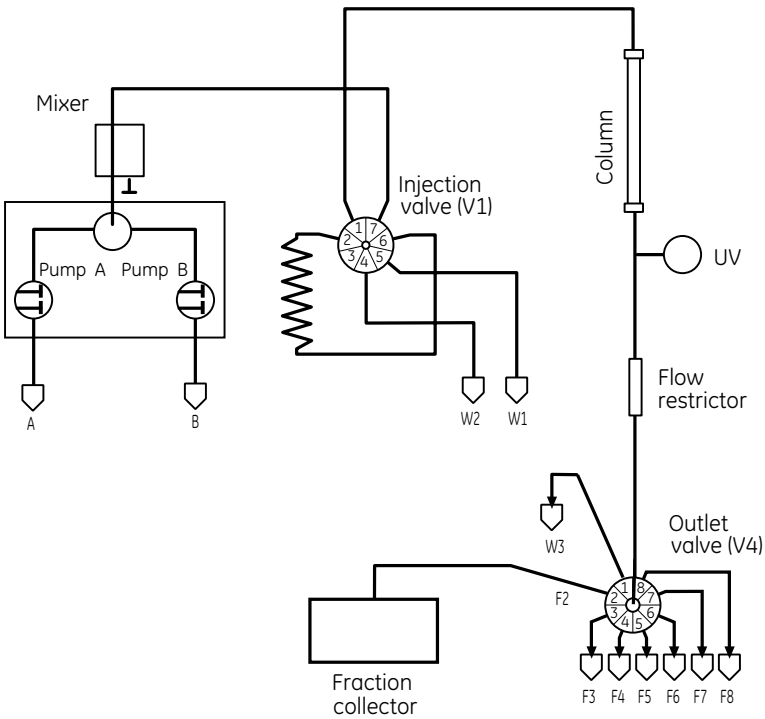
- Up to 8 vessels of any size can be used to automatically collect fractions over the entire flow rate range of the chromatography system.
- Combined with a fraction collector (Frac-920 or Frac-950), the optional outlet valve enables flexible volume fractionation in the same setup.

The optional outlet valve PV-908 (code no. 18-1175-86) is available for:

- ÄKTAbasic™ with UNICORN version 3.21 AB or higher.
- ÄKTAFPLC™ with UNICORN version 3.20 or higher.
- ÄKTApurifier™ UPC with UNICORN version 3.20 or higher.

1.3 Configuration overview

The illustration below shows the outlet valve combined with a fraction collector in ÄKTAbasic.



2 Safety

IMPORTANT! Fractionation is intended for laboratory use only, not for clinical or *in vitro* use, or for diagnostic purposes.

- The components are designed for indoor use only.
- Do not use in a dusty atmosphere or close to spraying water.
- Operate in accordance with local safety instructions.

WARNING! When using hazardous chemicals, all suitable protective measures, such as protective glasses, must be taken.

WARNING! Ensure that the entire chromatographic system has been flushed thoroughly with distilled water before removing any capillaries or components.

WARNING! Always disconnect the power supply before attempting to replace any item on the equipment during maintenance.

WARNING! If there is a risk that large volumes of spilt liquid may penetrate the casing of the equipment and come into contact with the electrical components, immediately switch off the chromatographic system and contact an authorized service technician.

CAUTION! Make sure ÄKTAdesign is switched off before installing the optional components. The mains power to the system must be switched OFF before disconnecting or connecting the UniNet-1 and UniNet-2 cables.

WARNING! When using hazardous chemicals, take all suitable protective measures, such as wearing protective glasses and gloves resistant to the chemicals used. Follow local regulations and instructions for safe operation and maintenance of the system.

3 Prerequisites

UNICORN versions must be installed in the computer connected to the chromatography system as listed below.

- ÄKTAbasic: UNICORN version 3.21 AB or higher.
- ÄKTAFPLC: UNICORN version 3.20 or higher.
- ÄKTApurifier: UNICORN version 3.20 or higher.

ÄKTAbasic, ÄKTAFPLC and ÄKTApurifier, respectively must be installed and fully tested before the optional components are installed. See the *Installation Guide* for your ÄKTAdesign chromatography system.

The general procedures for creating and editing methods are described in *UNICORN User Manuals*.

Note: *The system configuration delay volume must be recalculated and reset when the standard configuration after the UV flow cell is changed.*

WARNING! Make sure that the entire system has been flushed thoroughly with distilled water before removing any capillaries or components.

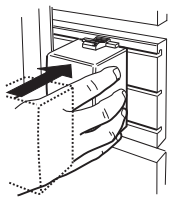
CAUTION! Make sure that the ÄKTAdesign instrument is switched off before installing the optional components. The mains power to the ÄKTAdesign instrument must be switched OFF before disconnecting or connecting the UniNet-1 and UniNet-2 cables.

4 Installation

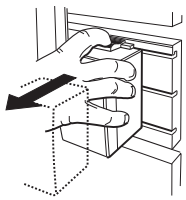
4.1 General mounting instructions

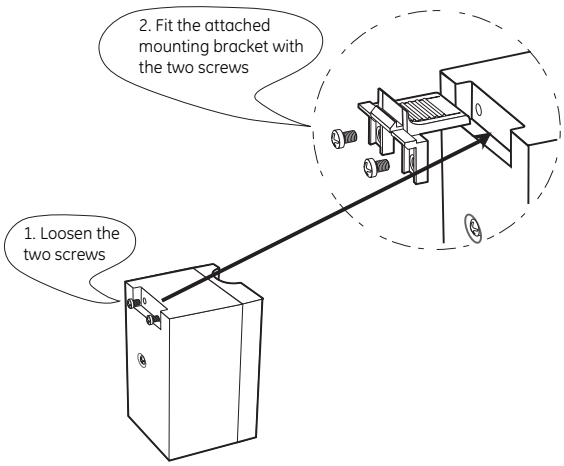
The optional outlet valve is mounted in the rails on the side of the modules. The valve is attached to the mounting rails with a snap-in bracket. The bracket is supplied separately with the valve and needs to be fitted as shown below before the valve can be attached.

Inserting components



Removing components



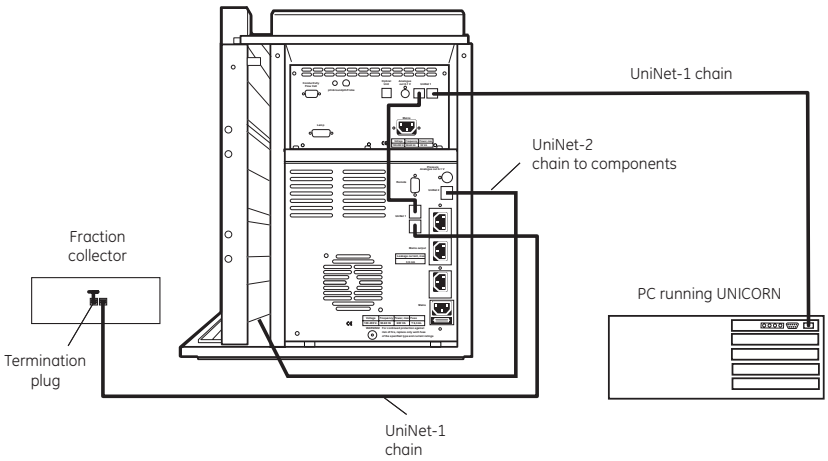


When selecting mounting location for the optional equipment it is important to choose a location which minimizes the length of the capillaries used to connect the optional components to the rest of the system.

4.1.1 UniNet connection

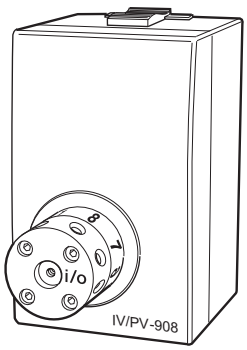
CAUTION! Make sure that the ÄKTAdesign instrument is switched off before installing the optional components. The mains power to the ÄKTAdesign instrument must be switched OFF before disconnecting or connecting the UniNet-1 and UniNet-2 cables.

Both the UniNet-1 and the UniNet-2 chain can be interrupted anywhere between the system pump and the termination plug to connect the optional components into the chain.

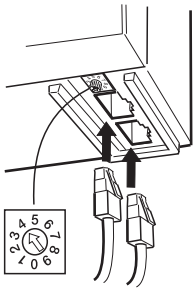


Use the supplied and existing UniNet-2 cables to connect the outlet valve into the UniNet-2 communication link.

4.1.2 Valve ID



Outlet valve PV-908



ID code switch

The outlet valve PV-908 has a unique ID code which identifies it to the UNICORN control system at system start-up. This ID code should be checked before installation.

The ID code for the valve and the corresponding instruction used in UNICORN to control it is as follows:

Valve function	ID code	Valve type	Instruction in UNICORN
Fractionation valve	4	PV-908	OutletValve

4.2 Unpacking

Unpack the optional components and check against the supplied packing list. Inspect the items for obvious damage that might have occurred during transportation.

CAUTION! Read the following information carefully, as well as all the additional instructions supplied with the components, to ensure that the ÄKTAdesign optional equipment is installed correctly.

4.3 Installing the outlet valve

4.3.1 Mounting the valve

To mount outlet valve PV-908 (see also *IV/PV-908 Instructions* supplied with the valve):

1 Set the rotary ID-switch at the bottom of the valve to position **4.**

2 Attach the snap-in bracket supplied to the valve using the screws (see page 11 in section 4.1 General mounting instructions).

3 Attach the valve to the system (see page 11 in section 4.1 General mounting instructions). Choose a location that minimizes the tubing length to other components connected to the valve.

4 Apply an identification number from the labels supplied. Place the number so that it is easily readable from the front.

4.3.2 Installing the UniNet-2 cables

1 Disconnect the UniNet-2 connector from the component that is closest to the outlet valve.

2 Fit the connector in the outlet valve.

3 Connect a new UniNet cable (supplied) between the outlet valve and the nearest component.

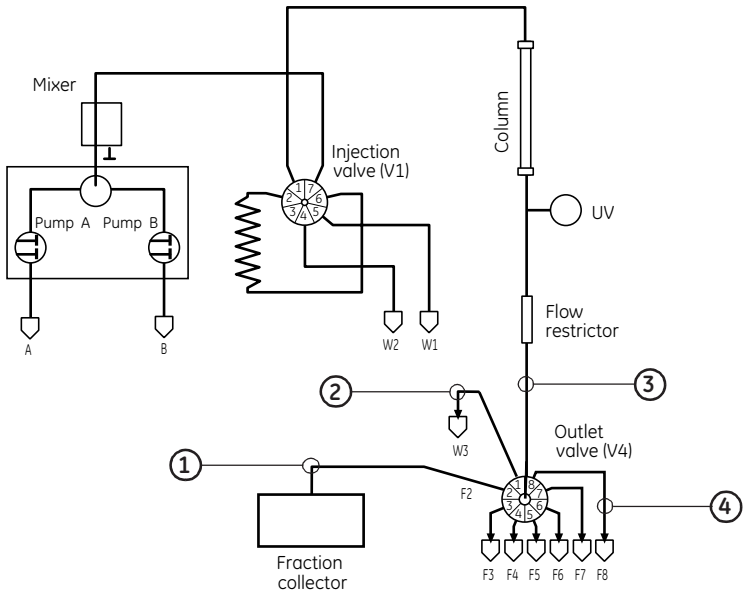
4.3.3 Connecting the tubing

To connect the tubing to the outlet valve:

1 Cut the tubing to suitable lengths. Use tubing with the correct inner diameter, as required by the system.

2 Connect the tubing as indicated in the table and figure. The figure shows ÄKTAbasic. In ÄKTAFPLC the fraction collector should be connected to port 1.

Note: *When using Frac-950 in ÄKTAbasic with strategy version *400 and higher, the outlet valve must be manually set to port 2 (fraction collector) in the method. When lower strategy versions are used, the outlet valve is automatically set to port 2.*



Tubing no.	Outlet valve port ...	Connected to ...
1	2	Fraction collector*
2	1	Waste flask
3	I/O (center)	Outlet of the flow restrictor
4	3–8	Fraction collection flasks

* In ÄKTAFPLC the fraction collector should be connected to port 1.

5 Preparation for use

5.1 Software configuration

5.1.1 Starting the system

1 Switch on the ÄKTAdesign chromatography system with the mains switch located at the front left on the system base.

2 Check that the computer and printer are switched on.

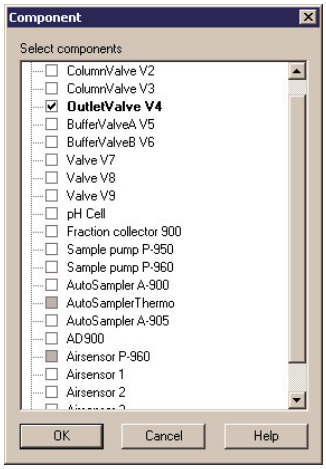
3 Log in (see the instrument user manual).

5.1.2 Installing the strategy and component in UNICORN

1 Make sure that the correct strategy is installed in your system. The strategy version must be *200 or higher. To install a new strategy, follow the software installation instructions found in the *UNICORN User Manuals*.

2 In **UNICORN Main Menu/Manager,** select **Administration:System Setup.**

3 Select **System** and then **Edit**. Click **Component.**

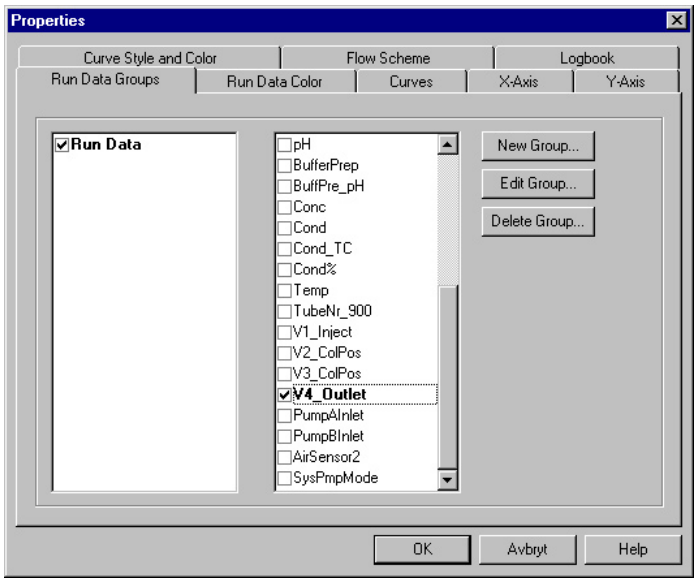


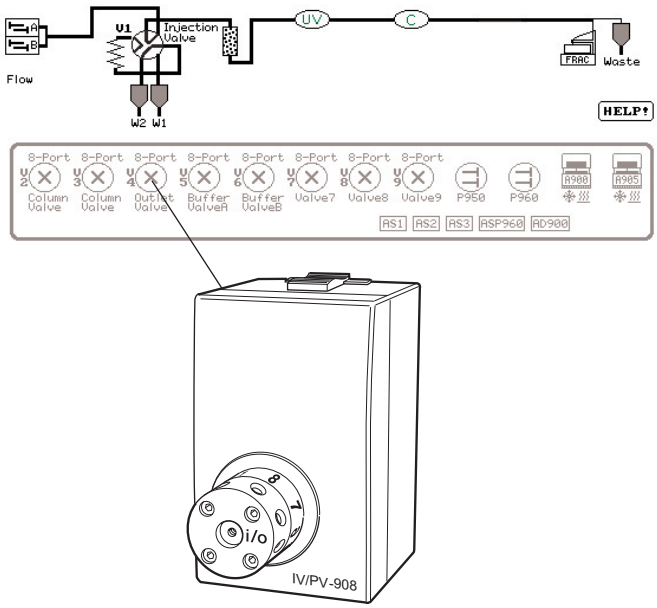
4 In the **Select components** list, select **OutletValve V4.**

5 Click **OK** twice and then **Close.**

The connected valve is automatically recognized by UNICORN. The outlet valve properties are designated **Outlet Valve** in the Flow Scheme view pane and **V4_Outlet** in the Run Data view pane.

To view **V4_Outlet** in the Run Data view pane, select the right-click command **Properties**.





1 Check that the outlet valve is indicated in the Flow Scheme in UNICORN.

2 Change the delay volume in **System: Settings** in the **System Control** module.

The instructions associated to the new valve appears when creating a new method or editing an existing method.

5.2 Testing the outlet valve

1 Check that the outlet valve added is indicated in the Flow Scheme in UNICORN.

2 Verify that the outlet valve is functioning properly by issuing manual commands from UNICORN as follows:

- In **System Control,** select **Manual: FlowPath.**
- Select instruction **OutletValve.**
- Set the outlet valve to, for example position **F4.**
- Manually run the system pump with distilled water at approximately 2 ml/min. Check that water is coming out from port 4 of the outlet valve.

6 Operation

The outlet valve properties are called **Outlet Valve** in the Flow Scheme view pane and **V4_Outlet** in the Run Data view pane.

Two fractionation instructions are available for the outlet valve:

- **OutletValve**
  This instruction parameter turns the outlet valve to one of the eight positions available. This makes the instruction suitable for controlling flowthrough fractionation before elution starts. The instruction is designated **V4_Outlet** in the Run Data pane.

- **OutletFractions**
  This instruction has three parameters, **How Many?, Volume** and **Start at.** This makes the instruction suitable for controlling large volume fractionation (min. 5 ml) during elution. Both instructions are independent of using fraction collector Frac-920 or Frac-950.

The procedure for using the outlet valve in UNICORN 3.20 – 3.22 differs from the procedure in UNICORN 4.0 – 5.01. Therefore, the procedures are described in separate sections.

Note: *When using Frac-950 in ÄKTAbasic with strategy version *400 and higher, the outlet valve must be manually set to port 2 (fraction collector) in the method. When lower strategy versions are used, the outlet valve is automatically set to port 2.*

6.1 UNICORN 3.20 – 3.22

In UNICORN 3.20 – 3.22 the Method Wizard does not support the outlet valve. The instructions must be manually added to the method.

6.1.1 Using the outlet valve for flowthrough fractionation

To prepare a method for flowthrough fractionation:

1 In the **UNICORN Main Menu,** select **File: New: Method** to create a new method.

2 Select **System, Technique, Template** and **For column.** Click **OK.**

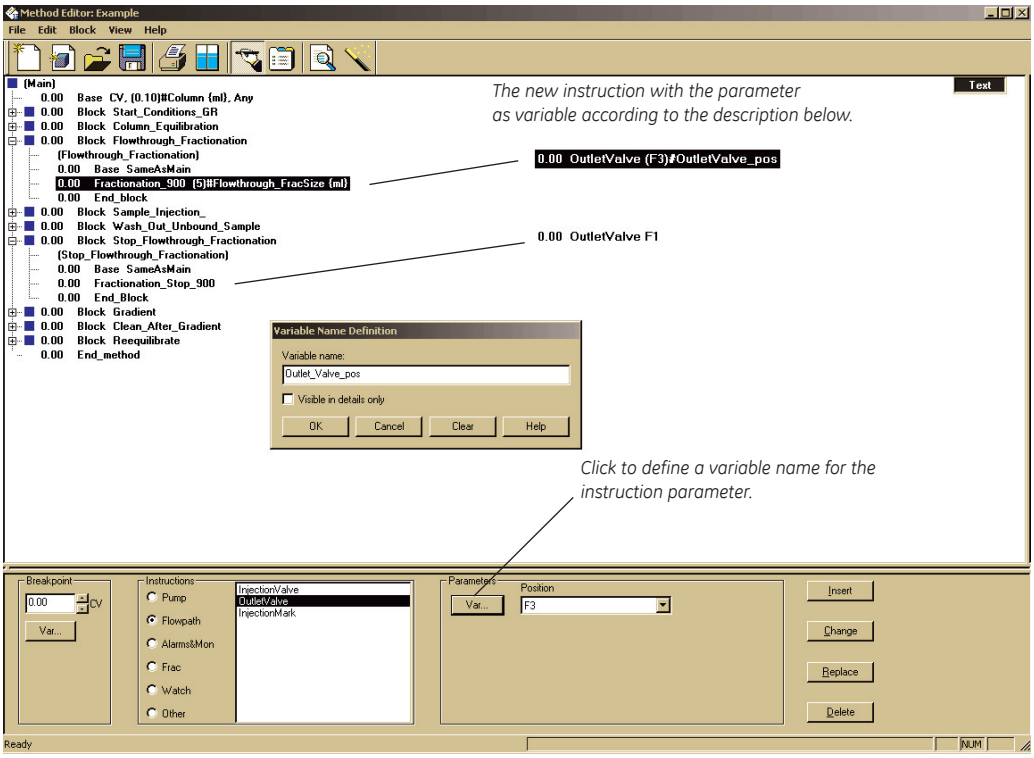
3 Select **View: Text instructions** to display the text instruction editor.

4 Double-click on the instruction block where you want to add the outlet valve instruction, i.e. **Flowthrough_Fractionation.**

5 Highlight the instruction **Fractionation_900** and delete it.

6 Select **OutletValve** in the **Instructions** field. The valve instruction parameter allows you to change all eight positions of the outlet valve synchronously.

7 Click **Var** to define a variable. The variable allows you to synchronously control the position of the outlet valve to the position you want.



8 Type a variable name, e.g. **Outlet_Valve_pos** for the instruction parameter.

9 Click **OK** to insert the parameter in the method.

10 Insert an instruction to reset the outlet valve. In the figure above the **Fractionation_Stop_900** instruction should be replaced with the **OutletValve F1** instruction.

11 Save the method. The outlet valve position can now be selected on the Variables page before starting the method.

6.1.2 Using the outlet valve for large volume fractionation

To prepare a method for large volume fractionation:

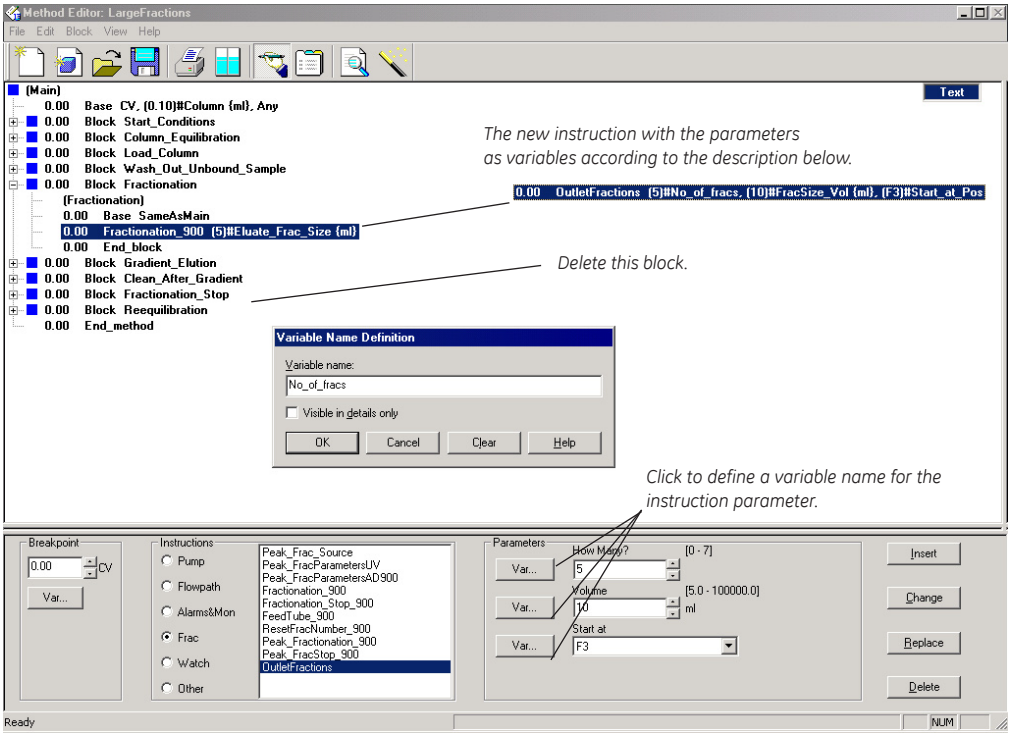
1 In the **UNICORN Main Menu,** select **File: New: Method** to create a new method.

2 Select **System, Technique, Template** and **For column.** Click **OK.**

3 Select **View: Text instructions** to display the text instruction editor.

4 Double-click on the instruction block where you want to add the outlet valve instruction, i.e. **Fractionation.**

5 Highlight the instruction **Fractionation_900** and delete it.

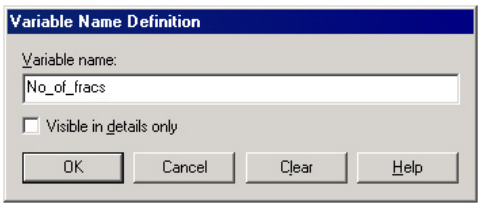


6 Select **Frac** in the **Instructions** field.

7 Select **OutletFractions** in the instructions list. The instruction parameters allow you to manually select how many fractions to collect, the volume of each fraction and which position to start from.

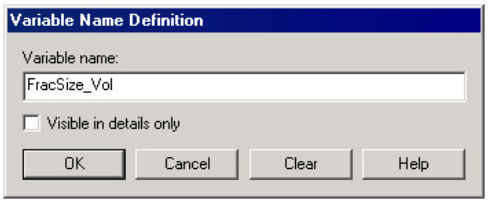
8 Click the upper **Var** button to define a variable name for how many fractions to collect, e.g. **No_of_Fracs.** This variable allows you to control the number of fractions to collect. When the number of fractions have been collected, the outlet valve is set to start position.

Note: *The instruction parameter **How_many?** can also be used to terminate outlet fractionation by setting it to 0. The outlet valve is then reset to start position.*



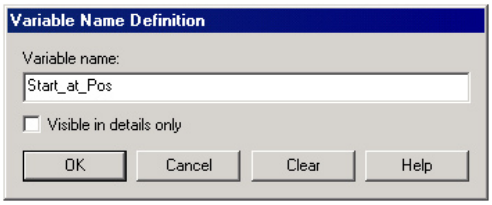
9 Click **OK.** The defined variable is inserted in the method.

10 Click the middle **Var** button to define a variable name for the size (volume) of the fractions to collect, e.g. **FracSize_Vol.** This variable allows you to control the volume of the fractions to collect.



11 Click **OK.** The defined variable is inserted in the method.

12 Click the lower **Var** button to define a variable name for the outlet valve port to start from, e.g. **Start_at_Pos.** This variable allows you to control the position of the outlet valve from which you start collecting fractions from.



13 Click **OK.** The defined variable is inserted in the method.

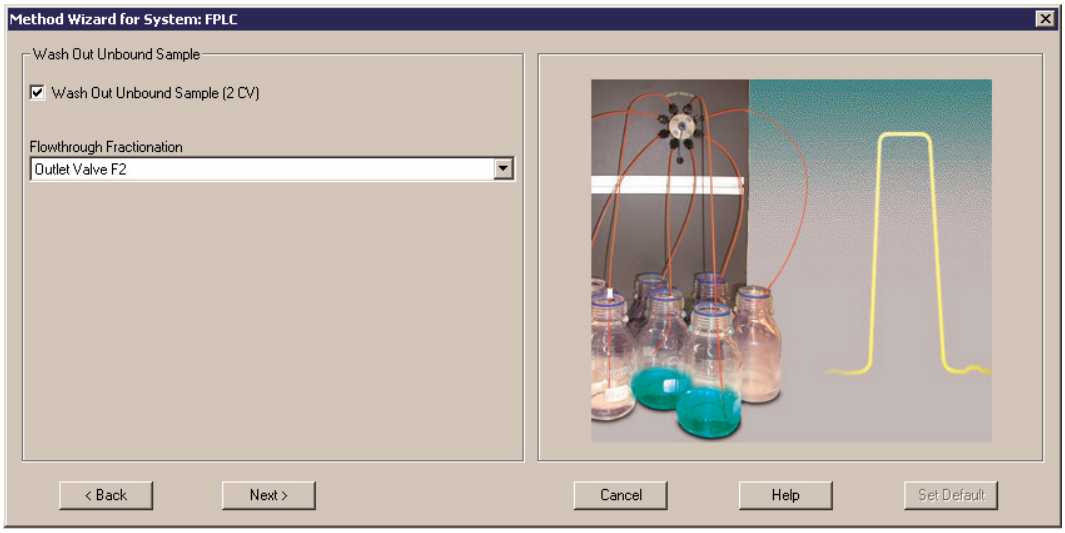
14 Highlight the instruction **Fractionation_Stop** and delete it.

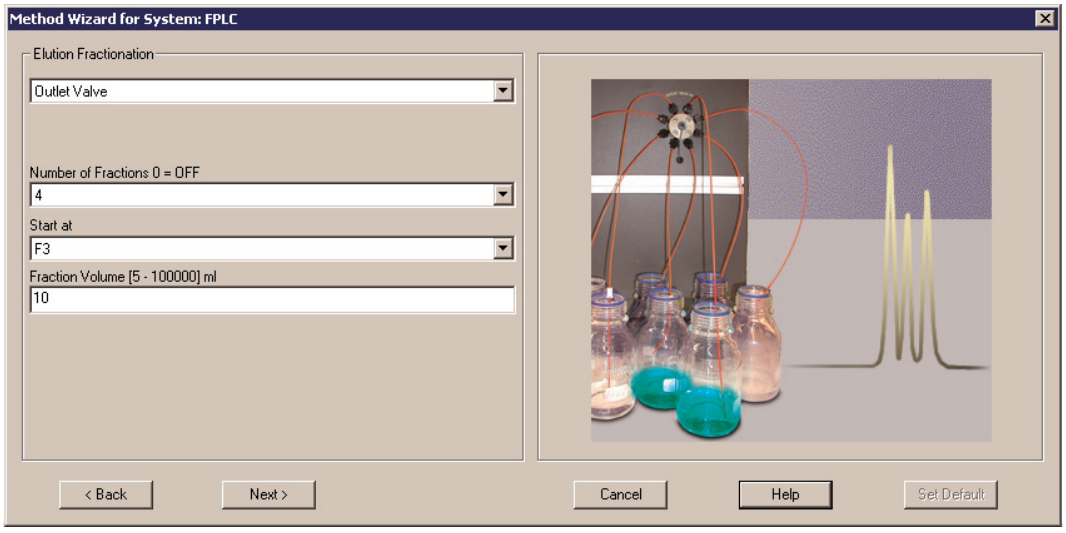
15 Save the method. The fractionation parameter values can now be changed on the Variables page before starting the method.

6.2 *UNICORN 4.0 – 5.01 or higher*

The Method Wizard will automatically include the functionality of the outlet valve.

To use the outlet valve in a method, select the desired outlet valve options in the **Wash Out Unbound Sample** and/or **Elution Fractionation** dialogs when creating the method in the Method Wizard.





7 Short instructions

The following short instructions are checklists for users who are fully familiar with the safety precautions and operating instructions described in this manual. The instructions assume that optional equipment is installed according to the installation instructions.

7.1 Converting to optional configurations

1 Wash the ÄKTAdesign flow path with distilled water.

2 Switch off ÄKTAdesign.

3 Prepare the component.

4 Attach the component to ÄKTAdesign.

5 Prepare the necessary capillaries and connectors.

6 Mount the capillaries and connectors.

7 Connect the component to the UniNet chain and if required to the mains power supply.

8 Check all connections.

9 Start up ÄKTAdesign.

10 Select the component in System Setup.

11 Test the function of the optional equipment manually.

12 Create a new method with the Method Wizard and make the appropriate selections to support the optional configuration. If the component is not supported by the Method Wizard, insert the required instructions in their proper positions in a new or modified method.

13 Set up parameters to suit your needs.

14 Perform a test run with distilled water to verify the optional configuration in the new or modified method.

15 Correct any faults and store the method.

7.2 Reverting to standard configuration

1 Flush ÄKTAdesign with distilled water.

2 Disconnect the system in System Control.

3 Switch off ÄKTAdesign.

4 Disconnect equipment to be removed from the UniNet chain and reconnect the UniNet chain for the standard configuration.

5 Remove capillaries and reconnect the system flow path to the standard configuration.

6 Check all connections.

7 Start up ÄKTAdesign.

8 Select a method supporting the standard configuration.

9 Set up parameters to suit your needs.

10 Perform a test run with distilled water to verify the standard configuration in the selected method.

www.gehealthcare.com/lifescience

GE Healthcare Bio-Sciences AB
Björkgatan 30
751 84 Uppsala
Sweeden

Drop Design, FPLC, Superloop, UNICORN and ÄKTA are trademarks of GE Healthcare companies. GE, imagination at work and GE monogram are trademarks of General Electric Company..

Microsoft and Windows are either trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries.

All goods and services are sold subject to the terms and conditions of sale of the company within GE Healthcare which supplies them. GE Healthcare reserves the right, subject to any regulatory and contractual approval, if required, to make changes in specifications and features shown herein, or discontinue the product described at any time without notice or obligation. Contact your local GE Healthcare representative for the most current information.

© 2005 General Electric Company – All rights reserved.

GE Healthcare Bio-Sciences AB, a General Electric Company.

GE Healthcare Bio-Sciences AB
Björkgatan 30, SE-751 84 Uppsala, Sweden

GE Healthcare Europe GmbH
Munzinger Strasse 5, D-79111 Freiburg, Germany

GE Healthcare UK Ltd
Amersham Place, Little Chalfont, Buckinghamhire, HP7 9NA, UK

GE Healthcare Bio-Sciences Corp
800 Centennial Avenue, P.O. Box 1327, Piscataway, NJ 08855-1327, USA

GE Healthcare Bio-Sciences KK
Sanken Bldg. 3-25-1, Huakunincho, Shinjuku-ku, Tokyo 169-0073, Japan

Asia Pacific Tel: +852 2811 8693 Fax: +852 2811 5251 • Australasia Tel: + 61 2 9899 0999 Fax: +61 2 9899 7511 • Austria Tel: 01/57606-1619 Fax: 01/57606-1627 • Belgium Tel: 0800 73 888 Fax: 03 272 1637 • Canada Tel: 800 463 5800 Fax: 800 567 1008 • Central, East, & South East Europe Tel: +43 1 982 3826 Fax: +43 1 985 8327 • Denmark Tel: 45 16 2400 Fax: 45 16 2424 • Finland & Baltics Tel: +358-(0)9-512 39 40 Fax: +358 (0)9 512 39 439 • France Tel: 01 69 35 67 00 Fax: 01 69 41 96 77 • Germany Tel: 0761/4903-490 Fax: 0761/4903-405 • Italy Tel: 02 27322 1 Fax: 02 27302 212 Japan Tel: +81 3 5331 9336 Fax: +81 3 5331 9370 • Latin America Tel: +55 11 3933 7300 Fax: +55 11 3933 7304 • Middle East & Africa Tel: +30 210 9600 687 Fax: +30 210 9600 693 • Netherlands Tel: 0165 580 410 Fax: 0165 580 401 • Norway Tel: 815 65 555 Fax: 815 65 666 • Portugal Tel: 21 417 7035 Fax: 21 417 3184 • Russia & other C.I.S. & N.I.S Tel: +7 (095) 232 0250, 956 1137 Fax: +7 (095) 230 6377 • South East Asia Tel: 60 3 8024 2080 Fax: 60 3 8024 2090 • Spain Tel: 93 594 49 50 Fax: 93 594 49 55 • Sweden Tel: 018 612 1900 Fax: 018 612 1910 • Switzerland Tel: 0848 8028 12 Fax: 0848 8028 13 • UK Tel: 0800 616928 Fax: 0800 616927 • USA Tel: 800 526 3593 Fax: 877 295 8102

imagination at work

User Manual 11-0009-08 Edition AC 03/2006

Elanders Östervåla 2006